CHIRONOMY IN THE ANCIENT WORLD

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N.B.: *A WinZip (.zip) archive* **(17.9 MB)** *containing a PowerPoint Presentation (.ppt) and sound files (.mp3) summarizing the historical and musical background to Suzanne Haïk-Vantoura's work may be downloaded via* **this link**.

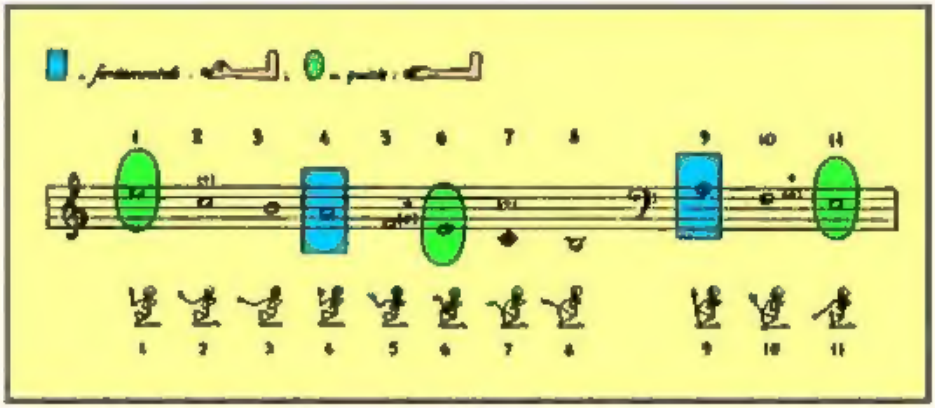
The **te`anim** are actually a transcription of a series of *gestures* of the hand and/or fingers, each gesture representing a musical value. In other words, the written signs are a shorthand for a specific chironomy (which word derives from the ancient Greek term for such a system). Haïk-Vantoura devotes an entire chapter in her book to the subject. It is fitting that we devote an entire page to the subject here.

Chironomy was a widespread art in the ancient world; and it endured well into medieval times. For that matter, vestigial (if sometimes rather complex) forms are still practiced by various religious communities, including certain ancient synagogue and Christian communities (including the Greek and Coptic Churches and the schools of Catholic Gregorian chant).

To understand the vital place that chironomy held in the music of the Temple, it is first necessary to place chironomy in its historical context, from biblical times until the present.

Chironomy has more visual documentation in Egypt than anywhere else in the ancient world; some specialists believe the art was likely *invented* there. It is found portrayed on the **mastabas** (monuments) and in the tombs of many of the ancient Pharaohs. Evidently the system of chironomy used remained essentially the same across many centuries, beginning with the Old Kingdom. (Some remnants of it exist among the Copts to this day.)

The late Professor Hans Hickmann of the Museum of Cairo analyzed the system of chironomy found on several **mastabas** and derived the above decipherment of the various gestures. The resulting scale (see above) is pentatonic, with eleven degrees and several possible modes. Like the biblical **te`anim** (and as we will see, the gestures that lie behind them), the Egyptian gestures do not of themselves indicate what mode is to be used. (This is a common feature both of ancient and medieval chironomic systems and of the notations -- often called *neumes* -- based on them.) For certain degrees, (+) placed above the note means that it may be raised by a half-step in certain modes. A note in parentheses (o) has the same significance. Some notes have *both* indications placed above them; thus, Degree 10 (for example) may represent f, g or g# depending on the mode employed.

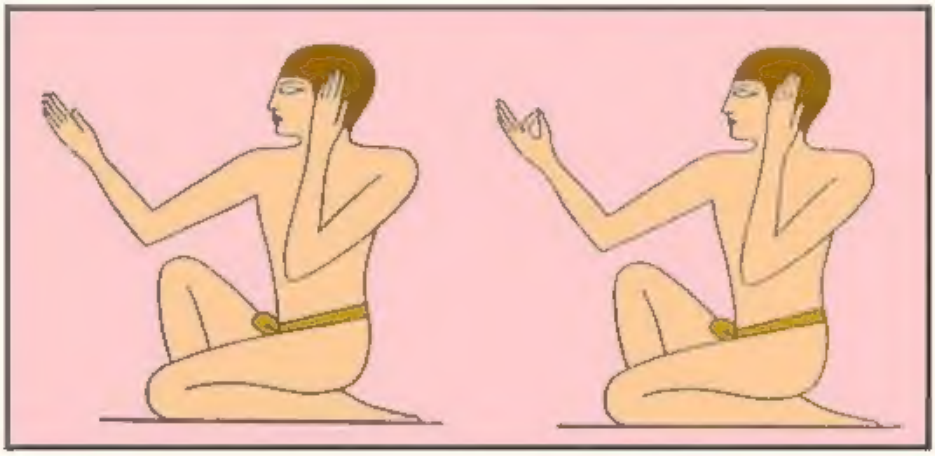


Hickmann's reconstruction of how the scale would sound (in each of its six possible modes) is given below in MIDI format. *NOTE: If you cannot play this file on your computer using the plug-in below, you may download the file via* **this link**.

Two basic hand-gestures are used in this form of chironomy, one representing the tonic or fundamental degree (associated with the blue rectangle) and the other representing the fifth degree (associated with the green ellipse). Hickmann used the note A, as Haik-Vantoura uses the note E, to represent the tonic degree out of convention; the actual pitches used are unknown.

"This discovery," wrote Hickmann, "therefore places the musical system of the Egyptians among all the theoretical systems known from antiquity. The other degrees of the scale filling the space between the fundamental and its fifth were represented by the chironomist [the conductor of the gestures] by the elongation of the hand, the arms forming an acute angle corresponding to a higher note. The ensemble of gestures forms of sort of scale...of which the number of degrees coincides with the musical scales known from the measures of the preserved instruments." (From a publication of the Museum of Cairo, source and date presently unknown.)

The above **improvisation** on a modern ten-stringed Hebrew lyre (**kinnor**) by Michael Levi is based on the fundamental mode of the scale reconstructed by Hans Hickmann. While much of the performance would be far too complex to indicate easily (if at all) by Egyptian chironomy, a simple heterophony accompanying it could be. (Attentive ears will pick up a citation of the First Delphic Hymn to Apollo, one of the few surviving works from ancient Greece, which was very likely accompanied on a lyre tuned to this very pentatonic mode.)

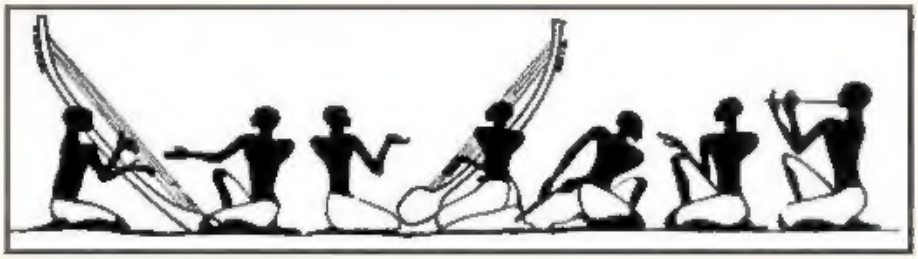


Unfortunately, Hickmann did not detail (not at least in any publication of his that I have seen) how he reconstructed the scale shown above. However, two clues at least to his thought processes are evident: 1) the forms of the hand-gestures are visually suggestive of the *tonal relationship* between the tonic and fifth degrees (the gesture for the fifth, in effect, being at right angles to that for the tonic); 2) in the various artistic portrayals, the chironomy is associated with vocalists, instrumentalists or both. This, with the various positions of the arm involved with various gestures, would have allowed Hickmann to test various hypotheses as to the meaning of the chironomy as a whole.

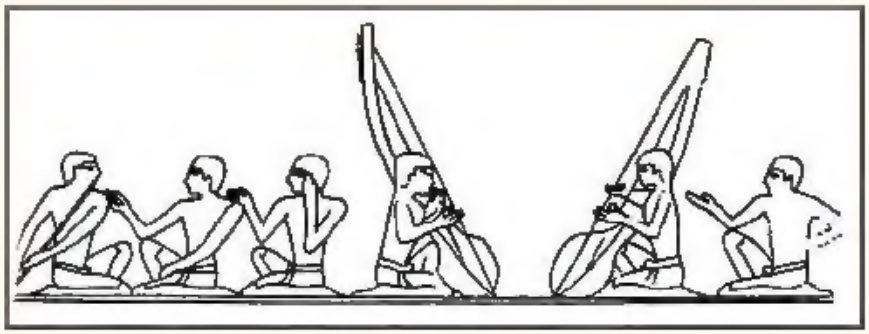
Another Egyptologist, Lise Manniche, describes Hickmann's analysis in her own book, *Music and Musicians in Ancient Egypt* (British Museum Press, 1991). "Hickmann analyzed the chironomists' gestures, and compared them with the positions of the musicians' hands, especially those of the harpists. The basis for his calcuations was the fact that a string of any given weight and tension will vibrate at double the frequency of another exactly similar string twice its length; the shorter string will produce the same note an octave higher. Stopping a string halfway along its length by a finger will create the same result, as the vibrating length of the string is halved. Other intervals are created by reducing the vibrating length of the string to different proportions. Thus the positions of the musicians' hands enable us to make some calculations about the intervals, based on a study of the vibrating lengths of various stringed instruments depicted in the representations. This entire scheme presupposes absolute faith in the accuracy of the ancient draughtsman, but there is in fact some consistency in the depictions, and a relation can be presumed between particular chironomic gestures and the fingerings shows" (*op. cit.*, p. 31). In effect, Hickmann's "virtual bilingual" for Egyptian chironomy was the accompanying illustrations of instrumentation, just as Haïk-Vantoura's "virtual bilingual" for the biblical **te`amim** was the syntax of the accompanying Hebrew verbal text.

In the illustration above, we see two chironomists making two different gestures with their hands: the one on the left the gesture for the fifth, the one on the right the gesture for the tonic. The angle of the forearm remains the same in both cases. According to Hickmann's "deciphering key" (as it were) for the Egyptian chironomy, the degrees of the scale represented by such gestures would be Degree 2 (C' or C#') and Degree 5 (F, G or G#), respectively.

The above illustration (after Haïk-Vantoura, *The Music of the Bible Revealed*, p. 74) is based on a bas-relief in the tomb of Nencheftkai of the 5th dynasty (ca. 2700 B.C., standard chronology). All the chironomists are producing the same gesture, corresponding to Degree 9 (a', the lowest tonic note) in Hickmann's reconstructed scale. Each instrumentalist has at least one chironomist apiece (the harpist having *two*). Interesting too is the fact that the large flute is exactly *twice as long* as the short flute, thus being pitched an *octave lower*. Finally, the harpist seems to be playing a harmonic on one of the strings. Evidently the instrumentalists (who accompany dancers in the original bas-relief) are playing in *unison* -- and possibly in *octaves*, if the degrees of the chironomic scale were relative rather than absolute in pitch. (A similar situation occurs today when the G clef is used in a staff carrying either a soprano part or a tenor part an octave lower.)



The above illustration (after Haïk-Vantoura, *op. cit.*, p. 75) is taken from a **mastaba** of the Old Kingdom. Here the two chironomists (on the left) are producing *different* gestures, corresponding to Degree 3 (B') and Degree 5 (F, G or G#) in Hickmann's reconstructed scale. Another man (on the right) is conducting a percussionist, who keeps time by beating a stick on the ground. Evidently the instrumentalists are playing in *harmony*, probably using a simple heterophony (the simultaneous playing of two separate melodies). Here the two degrees employed are a *fourth* apart, or else a *major or minor third* apart (acoustically speaking), depending on the mode employed.



The above illustration (after Hickmann) has no less than *three* chironomists, one of them apparently pressing his hand against his throat to alter the sound of his singing voice. (This technique is still used in some parts of the Middle East.) Quite likely the gesture he is making represents the note he is singing. The chironomist to the viewer's left conducts the flautist's melody; the one on the far right, at least one of the harpists. From left to right, the corresponding pitches in Hickmann's reconstructed scale are: Degree 5 (F, G or G♯), Degree 7 (C' or C♯) and Degree 10 (f, g or g♯). Here, then, we have pitches a *fifth* apart as well as a *fourth* apart (acoustically speaking), assuming that the mode dictates perfect intervals. Yet neither here nor in the preceding example are the notes used the primary notes of the scale (i.e., those marked by blue rectangles or green ellipses in my adaptation of Hickmann's chart).

Hickmann is not the only one who has written at length about chironomy in ancient Egypt. Professor Lise Manniche deals with it at considerable length (*op. cit.*).

While Manniche cites Hickmann's work numerous times in her book, she does not reproduce his reconstruction of the Egyptian scale. She maintains that given the artistic conventions of Egyptian artists, we cannot be sure whether their portrayals of different signs by different chironomists, or even of different notes played by different musicians, in what appears to be the same ensemble represent a genuine harmony or simply a succession of different notes in a melodic line.

Hickmann, foreseeing such criticism, put forward the above illustration (taken from the tomb of Ptahhotep at Saqqara, end of the 5th Dynasty) as evidence of genuine "harmony" in ancient Egypt. Here the chironomist produces two gestures simultaneously (the one using the hand-sign for the fifth, the other for the tonic). In Hickmann's original illustration, only the chironomist is featured; in Manniche's version, however, the chironomist is seated behind a harpist (*op. cit.*, p. 32). Surely it is possible that the harpist, or the harpist and the chironomist acting as vocalist, could produce two notes simultaneously!

Manniche herself notes about this portrayal: "[The] chironomist gives two signs to a harpist, one showing the outstretched palm, the other holding thumb and index finger together. The harpist plays two different notes: his right (lower) hand pinches one of the shorter strings, while the other, placed above, apparently plucks one of the longer strings" (*op. cit.*, p. 31). Manniche then cites Hickmann's proposal that "it might be possible to recognise the interval depicted as a fifth, the outstretched palm representing the upper note, the gesture of thumb and index finger held together indicating the lower" (p. 31). And yet she concludes: "it is clear that two notes are being indicated and played, but we cannot tell whether they are being struck simultaneously or one after another" (pp. 31-32)! But why make separate gestures with two hands, if the notes were not to be struck simultaneously?

Haïk-Vantoura had something to say about such reasoning as well. "There was the costly necessity of having one [chironomist] for each instrumentalist, as shown by many scenes. Without there being the objective of precision in diversity, these mute collaborators would have been just useless 'walk-ons'. (...) [This is] all the more important in light of their individual gestures, proving the intricacy of this method. Besides, it bears witness to a non-empirical *heterophony* practiced in that far-distant epoch (*op. cit.*, p. 71).

At any rate, the degree represented by the chironomist's right hand and arm seems to be Degree 10 (f, g or g♯); the degree represented by the chironomist's left hand and arm, Degree 3 (B). Here then (most likely) is the harmonic equivalent of a *major or minor third*, this time extended over an octave and a third (in effect, a *major or minor tenth*). This is a significant discovery, given that musicologists have barely acknowledged the use of *octaves, fourths and fifths* in antiquity! It would be consistent as well with the way the harpist is playing in the original portrayal, given the nature of the harmonic curve of his harp. It might well have been *necessary* to pinch the upper string to reach a pitch a major or minor tenth above the pitch of the lower string!

This is the only example Hickmann or Manniche has published where *two* hands are used by the chironomist to represent musical notes. In other portrayals, the chironomist keeps time (or so it appears) by banging one fist on his knee, presses one hand against his cheek or throat, or simply keeps one hand near the floor or behind his back, while the other hand makes gestures representing musical notes. Haïk-Vantoura notes this general cooperation of *both hands* in the chironomy, presaging something of importance when she approaches the chironomy behind the biblical accentuation.

The above illustration (after Manniche, *op. cit.*, pp. 24-25) is the most complete I have seen to date; it is taken from a mural in the tomb of Niankhkhnum and Khnumhotep at Saqqara (5th Dynasty). The ensemble in the top row features six chironomist/vocalists, three flautists and two harpists in a heterogeneous mixture. In the bottom row, dancers perform and seated women clap the time.

On the far right, yet another chironomist (who stands rather than kneels) leads the whole ensemble. According to the hieroglyphs on the mural, he encourages the ensemble "to get on with the singing of 'the one about the two divine brothers'...He holds the thumb and index finger of one hand together, and this third chironomic sign [the hand-signs for the tonic and fifth are also present in the ensemble] may also be directed toward the harpists. Correspondingly, three notes appear to be played on the harps. The right-hand harpist plucks the second longest string with his left hand and touches three of the shorter strings with his right. The second harpist also appears to be playing on the second longest string with his right hand. It would thus seem that the sign of index finger and thumb held together (given twice) signifies the lower of two notes in an interval, for in two instances it is the long strings which are struck. Unfortunately, as the left hand of the second harpist is missing, the evidence here is inconclusive." (*op. cit.*, p. 31).

This mural allows us to compare the gestures directed toward the flautists with those directed toward the harpists. As Manniche writes: "Two chironomists perform signs with their right hands which seem to correspond to the first two steps in the flute's scale; the right-hand flautist appears to cover all the finger-holes, whereas the left-hand one leaves the bottom one open. The chironomists' gestures are similar to those described above, although the angles of the arms differ, so the interval played by the two flutes must correspond to that between the second(?) and sixth(?) strings of the harp. This implies that the intervals between individual strings on the harp must have been fairly small; four strings seem roughtly to equal one finger-hole on the flute" (*op. cit.*, p. 32).

Yet Manniche's comment above can cause one to overlook something fundamental: *the division of the ensemble into sections of chironomists and instrumentalists*. Within the sections, we find the following:

Ensemble sections	Degrees produced by chironomists		
1 chironomist and 2 flautists	Degree 7 (C or C#)	(none)	(none)
2 chironomists and 1 flautist	Degree 9 (a)	Degree 7 (C or C#)	(none)
3 chironomists and 2 harpists	Degree 7 (C or C#)	(in apparent repose)	Degree 9 (a)
Ensemble leader	Degree 9 (a) (?)	(none)	(none)

The section on the far left (the first one in the above table) has *one* chironomist and *two* flautists; each flautist is covering a different set of holes on his flute. The middle section has two chironomists and one flautist; while the flautist's left hand is missing, he seems to be playing the same note as the flautist sitting behind him in the first ensemble. (It is this pair of flautists that Manniche describes above.) Since the other chironomist in the middle section makes the same gesture as the chironomist in the left section, and since the other flautist in the left section is using a different fingering (and for a higher note), it appears that the left flautist in the left section is playing Degree 7 and the right flautist in the left section is playing Degree 9. The flautist in the middle section therefore is playing Degree 9 also.

The section on the far right has three chironomists (the middle one apparently holding his hand in repose, waiting to produce a gesture) and two harpists; the latter seem to be playing the same notes. "Unfortunately, as the left hand of the second harpist [the one on the left in the far right section] is missing, the evidence is inconclusive" (*op. cit.*, p.31). Again, the harpists would reasonably be playing Degrees 7 and 9, as indicated by the gestures. Since there are *four* possible pitches (within the modal framework of the chironomic system) between Degrees 7 and 9 (a, b, C, C#), it seem likely that the first two notes of the flutes would have been (a) and (C#), while the harps would have had four strings tuned to all the possible modal pitches between (a) and (C#). It may even be that the flutes were actually playing (a) and (C#), and the harps (naturally) were playing the same notes. Dare we be this precise?

To this author, indications like these mitigate Manniche's repeated cautions about reconstructing the norms of Egyptian music. It is certainly true that our understanding of that music has limits. (For example, what note the ensemble leader is indicating -- if indeed he is not simply snapping his fingers to encourage the ensemble -- is unclear.) However, it seems equally certain that Egyptian artwork was meant to *communicate* something about Egyptian music, and in *non-empirical* terms. The chironomy itself is portrayed as a *precise*, yet *evocative* way of expressing musical values -- one capable of *substituting for written notation*, or even of being the *basis* of such notation. Such a notation could easily have been kept secret by the priests, while the chironomy it transcribed was taught publicly. We know that a marginal form of musical notation (based on cuneiform) was kept "secret" among the "initiated" in ancient Babylonia; and likewise the singers of the Abyssianian Church used a secret notation of syllables written above the sacred verses (Curt Sachs, *The Rise of Music in the Ancient World: East and West*, 1st ed. (W.W. Norton & Co. Inc., 1943, pp. 85-86).

Chironomy in Egypt was not limited to the conducting of instrumental music. In the "Song of the Nile", we are told, "men sing to you with the hand" (Hickmann, cited by Haik-Vantoura, *op. cit.*, pp. 71, 91). This may refer to the section leaders only; Manniche remarks that the ensemble leader (when he seems to be singing) may have been simply "miming the notes and willing the orchestra to produce a particular quality of sound" (*op. cit.*, p. 30). She then adds this evocative comment: "The short texts written above the ensemble refer to the action of the players: 'striking the harp', 'blowing the pipe', and so on. The chironomist is said to be 'singing' to the harp, flute or clarinet. The word for 'singing' is qualified by a hieroglyph in the form of a human arm, not, as we would perhaps expect, with an ear or pair of lips. *But to a deaf person today a gesture would immediately suggest a substitute for sound, and as far as ancient music is concerned we must indeed use our eyes rather than our ears*" (emphasis mine).

Chironomy, like the music it conducted, found its way into all major contexts of Egyptian life: the priestly, the courtly and the popular, none of which were ever divided wholly from the religious. Chironomy even had a *divine connection* in the Egyptian mind. "On a rather intellectual level, a goddess called Merit was considered to be the personification of music, although she never became a goddess of the people with cult chapels of her own. It says something about the Egyptians' desire to express their music visually that she was a '*chironomist goddess*', whose major task was *to establish cosmic order by means of her song and gestures*" (*op. cit.*, p. 57, emphasis mine). But Merit's task also testifies of the *precision* of Egyptian chironomy, and to the *nobility* of the music which it conducted.

Here then are the essential characteristics of Egyptian chironomy:

	Egyptian chironomy represented *precise musical values* (from all indications, the degrees of a modal pentatonic scale);
	It could represent *single notes* or (through the use of both hands by a chironomist or by several chironomists) *simple intervals*;
	In an ensemble, it could be used by the *ensemble leader* and by *section leaders* to conduct a simple *heterophony*;
	It used *both hands* in cooperation (to represent notes or notes and rhythm);
	It was used in *priestly*, *courtly* and *popular* music (all of which generally had *religious overtones*);
	As an art form, it *took the place of musical notation* (evoking to the eye what the ear heard).
	As an art form, it had a *connection with the divine* in the Egyptian mind.

All these characteristics are relevant to understanding the chironomy of the ancient Hebrews.

The illustration above (taken from the out-of-print *Music in Ancient Israel* by Alfred Sendrey) is taken from a vase fragment from Bismaya in ancient Sumer, 3200 B.C. (standard chronology). It portrays musicians, clappers and what appear to be dancers. Two of the musicians are harpists; two play drums; yet another claps and sings. The original source is *Musik der Antike* by Curt Sachs (Potsdam, 1928)

What then of the man in front of the ensemble? What is he doing? First, notice the *rapt look* passing between him and the musicians. We have seen this sort of rapt concentration before, in Egyptian ensembles, between the chironomists and the musicians they conduct -- and we will see it again in other contexts. Second, notice what he is doing with his hands. Each hand seems to be producing a slightly different gesture. Is it possible that he is producing a *two-handed chironomy* representing musical values? And what of the dancing figure above the middle of the ensemble, making similar gestures with both hands? Is he also producing chironomy -- this time, perhaps, to pantomime dance, such as the Greeks did much later?

This stone relief found at Sandchirli (dating from the time of the Mitanni, 15th century B.C.) shows a Babylonian minstrel playing a long-necked lute in front of a "raptured listener" (in the words of Alfred Sendrey). The original relief is now in the Berlin Museum. The original source of this illustration (cited by Sendrey, *op. cit.*, p. 51) is Alfred Jeremias, *Handbuch der altoientalischen Geisteskultur* (Leipzig, 1913).

A "raptured listener"? Look more closely. There is that same *rapt look* on the part of *both* the musician and the "listener". Moreover, the "listener" seems to be taking a very *active, energetic stance* -- as if there is an *interaction* between him and the lutenist. Finally, notice the *hands* of the "listener" - they are making specific *gestures*, widely spaced from each other. Usually, when clapping hands are portrayed, they are placed much closer together (for when one claps, one matches force to motion in an optimum way). Here may beyet another example of Mesopotamian chironomy: much later than the Sumerian, but still two-handed and similar in principle and appearance.

This example of Etruscan art is well-known among students of classical culture. It was found in a tomb dating to the 6th century B.C. (original photo courtesy of Lauros-Giraudon, cited by Haïk-Vantoura, *op. cit.*, p. 76). What seems to be less well-known is its testimony to the ancient use of chironomy. Once again, we see the use of *two hands* (this time in fairly complex gestures); we also see a *rapt attention* between the chironomists (though this is consistent with their personal relationship as well).

"The couple," Haïk-Vantoura writes, "is performing a gesture with the right hand: the index finger extended, the fourth and fifth fingers curled back (the position of the wife's hand is equally characteristic). There is no doubt that this is a scene of musical chironomy; the "inward" look of the two deceased suggests the reminiscence of a sweet melody" (*op. cit.*, p. 76).

A sweet reminiscence indeed...and no doubt an evocation of a happy life that ended far too soon for this wealthy couple...

This example of medieval art from a mural in Kyzyl, Chinese Turkestan, is found in the Berlin Museum (cited by Haïk-Vantoura, *op. cit.*, p. 77). Complex gestures of purely religious significance are common enough in Asian artwork. However, since the sacred musician (on the right) is holding a double pipe (not easy to see in this photocopy of a photograph), this mural surely relates to the inspiration of religious music. (Notice the *halos* around the goddess and the musician; note also, once again, the mutual *rapt look* of the pair and the *two-handed chironomy* used by the goddess.)

"The musician," Haïk-Vantoura writes, "is 'reading' the melody dictated to him by the significant positions of the fingers of both hands of the goddess. The same suggestive expression is on both faces. Here is a vestige, a thousand years distant, of an explicit, traditional chironomy in Eastern Asia" (op. cit., p. 77).

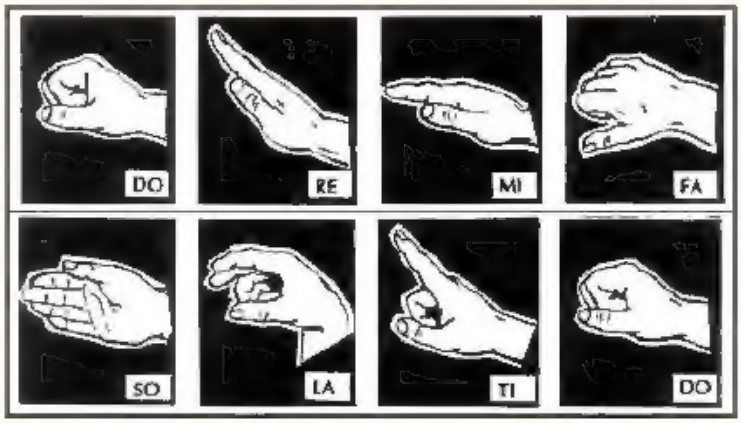
This mural may remind the *cognoscenti* of something else: the Jewish tradition that the **te'amim** were revealed by God to Moses on Sinai...

Here a *caution* must be given. Hand-gestures were used for other reasons besides the conducting of music: to pantomime dance, or to convey religious symbolism (as in Hinduism). Haïk-Vantoura, not being a specialist in Hindu religious gestures, might have *misread* the significance of the gestures on the left because of their musical context. But that context, and the use of two hands rather than just one, is nevertheless significant...

This illustration is taken from the frontispiece of Alfred Sendrey, *The Music of the Jews in the Diaspora* (New York: Thomas Yoseloff, 1970). It treats its subject (as the subtitle says) "up to 1800".

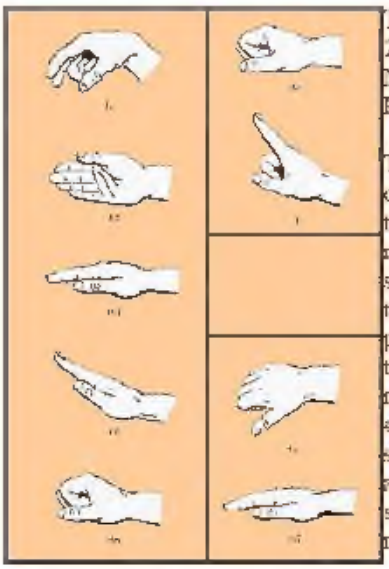
The original source of this illustration is the Manasseh Codex, preserved in the Heidelberg University Library. It portrays the Jewish minstrel Susskind of Trimberg (far right), evidently performing in a royal court.

Notice once again the *rapt attention* the audience (the king and two members of the court) give the minstrel, who seems to be clapping. Notice too the *gestures* that the court members are making. One hand is held in repose, while the other hand seems to be drawing figures in the air with the index finger. Here is yet another testimony to the survival of chironomy, this time in a secular setting.



Even in modern times, chironomy is used to teach children (and some adults) the tonal relationships between the degrees of the diatonic scale. Above is a table containing the eight gestures used in the Kodaly Method of musical instruction.

Some readers may already have recognized these gestures, apart from any teaching method: they were used in the movie *Close Encounters of the Third Kind* to represent the "signature theme" of the aliens. (The original version of this particular illustration, drawn by Gary Fackler, was featured in my article, "Music of the Temple", in *Archaeology and Biblical Research*, Vol. 2, No. 4, Autumn 1989, pp. 113-122 and 129.) I have even seen them used on stage, in a theater production of *The Sound of Music* in Houston, Texas (December 1999), to support that famous song: "Do Re Mi...".



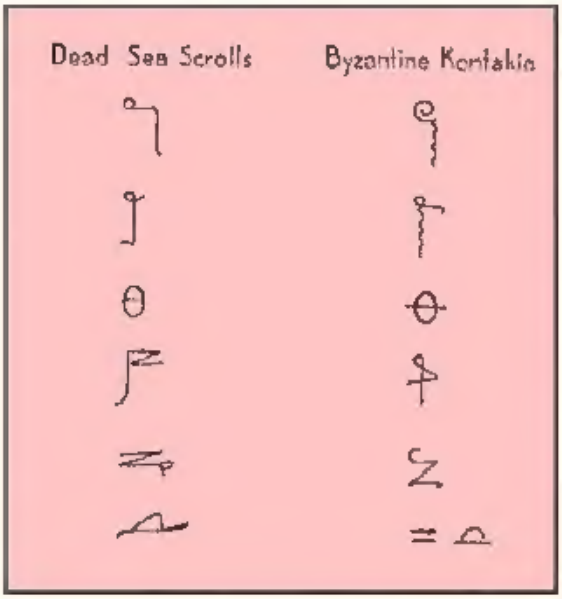
The presentation on the left is taken (as were the gestures illustrated above) from Lois Choksy, *The Kodaly Method: Comprehensive Music Education from Infant to Adult* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1974), pp. 20-21. Ms. Choksy is one of the premier teachers of the Kodaly Method in Canada.

The Kodaly Method (writes Choksy) has among its tools "the use of hand signs, which originated with John Curwen in 1870. They have been incorporated, with only minor changes, to reinforce intervallic feeling. They present a visualization in space of the high-low relationship among the notes being sung. For the pentaton [the five degrees of the pentatonic scale as found within the diatonic scale] the hand signs are [as found in the far left cell of the table on the left]. The hand signs for the half-steps *ti-do* and *fa-mi*, taught later, are *ti* which points up to *do*: [upper right cell of table] *fa* which points down to *mi*: [lower right cell of table] thus emphasizing the smallness of these half steps. The hand signs are shown here as the person making them with his right hand sees them. The signs are made in front of the body, with the do sign occurring at about waist level, the *la* at about eye level. The distance between the hand signs should reflect, to some extent, the size of the interval being sung and shown. Thus *so-mi*, a minor third, should be shown as a larger movement in space than *sol-la* or *do-re*, major seconds. Octaves are shown by the same sign but in the correct high or low relationship to the rest of the scale" (*op. cit.*, pp. 20-21).

We see some obvious parallels here between the Kodaly gestures and those found in ancient cultures, notably those in the Egyptian and the reconstructed biblical chironomies. For one thing, there is the idea of relationship in space representing relationship of pitch: this is found in both the Kodaly and the Egyptian chironomy, though not (it would seem) in the biblical. But there is another factor, strangely left undiscussed by Choksy (aside from how the gestures represent the smallness of the intervals *fa-mi* and *re-do*): *the way the gestures evoke to the eye the tonal relationships of the degrees they represent*. This is a common feature to the Kodaly, Egyptian and biblical chironomies, and likely was a feature of other ancient chironomies as well.

It would seem that the creators of these chironomies understood the tonal relationships between degrees in similar ways, and therefore created similar gestures to represent these relationships. The parallel between the fifth degree (*so*) in the Kodaly Method and in Egyptian chironomy is exact, and as we will see, the same gesture appears in the biblical chironomy I have reconstructed. The gesture for the third degree (*mi*) of the *scale* in the Kodaly Method is identical to the gesture for the third degree of the *mode* in the biblical chironomy (as we will see). The gestures for the tonic degree (*do*) is not identical in the three systems, but they all convey a sense of *finality or stability* to the eye (as the return to the tonic does to the ear). The gesture for (*la*) in the Kodaly Method is similar to that for the sixth degree in the biblical chironomy; and the Kodaly gestures for (*re*) and (*ti*), while not identical to the biblical gestures for the same degrees, do indicate the same tonal relationships with the tonic in a similar way.

From these ancient and modern examples, then, we see that chironomy can readily take the place of written notation. Gestures of the hand and fingers can evoke by their forms, motions and even "muscle sense" the tonal relationships between the degrees of a scale.



The illustration on the left is taken from an article by the late Eric Werner, "Musical Aspects of the Dead Sea Scrolls" in *The Musical Quarterly* (1957, No. 1, p. 24). (The article is subtitled: "For Curt Sachs [himself now deceased] on his 75th birthday.") Its significance for our subject is to illustrate the subject of *neumes*. In the margins of certain Dead Sea Scrolls (the Isaiah Manuscript and the Habakkuk Commentary) are found curious signs, different (as Werner acknowledges) from the **te'amim** in the Masoretic Text. They have no parallels among Roman, Syrian or Armenian neumes. Curiously enough, though, they do have parallels with certain "paleo-Byzantine" neumes found in early Byzantine and Slavonic manuscripts. These neumes belong to the "*notation Kontakarienne*", so-called because of its application to the Byzantine Kontakia hymn type (plural Kontakion, 5th-7th centuries A.D.). It is known that Syriac and Hebrew poetry had a great influence upon the Kontakion. At any rate, the notation itself was used during the 9th and 10th centuries in Byzantium; it retains its original forms in the oldest Slavonic manuscripts.

What is important about the above comparison is that it points to "a direct or indirect relationship between the Dead Sea Scrolls and Byzantine or paleo-Slavonic manuscripts" (Werner, *op. cit.*, p. 24). Haïk-Vantoura notes as well that "there are curious, marginal signs found in manuscripts discovered...near the bank of the Dead Sea -- *signs which evoke those of the first Byzantine notation, which is known to have sprung from chiranomy*" (Haïk-Vantoura, *op. cit.*, p. 9).

Besides this testimony, there is that of certain signs found recently in certain Dead Sea Scroll fragments by Rochelle Altman -- signs identical or nearly so to certain of the **te'amim**! (Her work on this subject, part of a larger thesis, is to be published in an upcoming book.) Moreover, musicologist and Hellenist Denise Jourdan-Hemmerdinger has analyzed the signs present in a papyrus of a text by Euripides, which she discovered in 1973. "Curiously, certain signs are identical in form to the **te'amim**. 'All the **te'amim** are present here or there,' she says, in the notation. They are placed sometimes above, sometimes below the words as in the Hebrew Bible. Of course, we must not imagine that these signs had the same significance for the Greeks as for the Hebrews. Nevertheless, they do concern music. Consequently, the **te'amim** undeniably belong to the world of antiquity" (Haïk-Vantoura, *op. cit.*, p. 497).

By early Christian and medieval times, however, the simple clarity of ancient chironomy had been largely lost, even as various forms of neumes arose in association with various gestures. Nevertheless, at the end of the Middle Ages, it was still customary (for example) for the precentors in the Greek Church to use gestures of the right hand in preference to the neumes then associated with it. Such gestures were still called "chironomy". (Cf. O. Fleischer, *Neumen-studien*, cited by Haïk-Vantoura, *op. cit.*, p. 79)

Why then did chironomy become inefficient in the Middle Ages? Ancient melody, as we see it in the few surviving Greek sources especially, was characterized by its *simplicity*. Egyptian chironomy indicates the same, and so (naturally) do the biblical melodies reconstructed by Haïk-Vantoura. By the end of antiquity, however, the melody became more complex, less attached to the verbal syntax, often with many more notes sung upon a single syllable, and (at least among the Greeks) more "enharmonic" in its tonal basis. That is, the melodic line had more sinuous contours; it also more potential degrees within the octave, with less "pure" relationships between them, and thus with a less strict tonal syntax (tonality) in their ensemble. Thus "art music" was becoming *decadent* -- more like "folk music" in its structure (i.e., more *pathogenic*), and with a more exotic or even sensuous ethos (moral force). Chironomy, with its associated notations, had to expand to keep up; and in so doing, it lost its ancient effectiveness.

Unfortunately, when the so-called "Tiberian" **te'amim** appeared in the 9th century, this general *complexification* of melody and chironomy alike had gone on for some time. At the same time, the ancient classical liturgies (including that of the Temple at Jerusalem) had all perished in practice, only the "folk" liturgies of the synagogues and other communities had survived. It was easy to consider the **te'amim** as being like the notations current at the time, and the melodies it represented like the melodies current in the synagogue. This was all the more true in that, when the Masoretes and later grammarians analyzed the "Tiberian" **te'amim** from the Talmudic premise (the **te'amim** are primarily punctuational), the notation appeared as complex and ineffective in the musical sense as any other form of neumes current at the time.

Thus the true capabilities of ancient chironomy have remained hidden from specialists...and with it, the true nobility and elegance of ancient music as based upon it.

What does all this have to do with the music of the Temple, or of the cantillation of the Hebrew Bible as such? Are there any indications in the Bible and history that chironomy was used by the biblical authors, or by the Levites?

Indeed there are! Toward the end of King David's life, he created an "academy" to train Levitical families in the singing of psalms before the LORD. "Four thousand of these," he said, "shall offer praise to the LORD with the instruments which I have made for praise" (*1 Chronicles 23:5*, RSV). "David and the chiefs of the service also set apart for the service certain of the sons of Asaph, and of Heman, and of Jeduthun, who should prophesy with *lyres* (**kinnorot**), with *harps* (**nevalim**), and with *cymbals* (**tsiltsilim**)" (*1 Chronicles 25:1*). (For more on these instruments, see **The Biblical Musical Instruments**.)

How was the ensemble organized? The "sons of Asaph (were) *under the direction of* Asaph, who prophesied *under the direction of* the king. (...) the sons of Jeduthun (were) *under the direction of* their father Jeduthun, who prophesied with the lyre in thanksgiving and praise to the LORD. (...) They [including the sons of Heman] were all *under the hand of* their father in the music in the house of the LORD with cymbals, harps, and lyres for the service of the house of God. Asaph, Heman and Jeduthun were *under the order of* the king" (*1 Chronicles 25:2-6*).

When one looks at the original Hebrew for the italicized phrases above, one notices something peculiar: the sons of Asaph were conducted **`al yad 'asaf**, literally "according to the *hand* of Asaph". Whereas the sons of Heman and Jeduthun were conducted `al yede..., "according to the *hands* of..." their fathers; and Asaph, Heman and Jeduthun likewise were conducted **`al yedê ha-Melekh**, "according to the *hands* of the king." No ancient or modern version to my knowledge makes the distinction; yet **`al yad** seems not to be a textual corruption. Not even the Masoretic notes collected in the Ginsburg Edition note a variant reading. It is true that **`al yad** and **`al yedê** are extremely common phrases in the Hebrew Bible, with all sorts of literal and figurative applications. Yet the *hierarchical organization* of the musical ensemble is significant; and it colors the possible meanings of these two phrases.

Haïk-Vantoura concluded that these phrases in this context actually denote the use of *chironomy*. We are told specifically (in *1 Chronicles 25:3*) concerning "the sons of Jeduthun...according to the hands of their father Jeduthun on the kinnor, [Jeduthun being] the one prophesying to give thanks and praise to the LORD" (literal Hebrew). The RSV and even the KJV are misleading here. The sense of the Hebrew (thanks to its combination of accentual and verbal grammar) is that the *sons* of Jeduthun were directed by him in performance on the **kinnor**, while Jeduthun himself was "prophesying" (in song). This use of "prophesying" to describe singing is consistent with what we read elsewhere about the nature of biblical psalmody, notably in *1 Chronicles 16:41-42*: "With them [the priests offering sacrifices] were Heman and Jeduthun, and the rest of those chosen and expressly named to give thanks to the LORD, for his steadfast love endures for ever. Heman and Jeduthun had trumpets *for the music* [literally, "to be sounded": **l'mashmi`im**] *and instruments for sacred song* [literally, "and instruments of the song of God": **ukhlê shir ha'elohim**]."

In a still earlier incarnation of the psalmodic ensemble (we are told), the singers Heman, Asaph and Ethan played the cymbals (*1 Chronicles 15:19*), so it seems likely that Asaph's sons played the cymbals in the ensemble described in *1 Chronicles 25*. This would leave Heman's sons to play the harps in that later ensemble. Now the use of only *one* hand by a section leader to conduct the cymbals makes sense, as does the use of *both* hands by the section leaders to conduct the harps and lyres (or by King David himself to conduct the section leaders). Harps, lyres and singers are capable of notes and melismas, as well as simple harmony! With the section leader giving the melodic line with his gestures and two (at least) of the section leaders giving parallel gestures to their sections, simple intervals and even triads would have been possible. *Weigh this statement carefully* (**selah**)!

Notice now the parallels between the psalmodic chironomy described above and Egyptian chironomy. We see documented in Egypt an *ensemble leader* and three *section leaders*. We see different instruments under the section leaders' direction, and the section leaders themselves under the direction of the ensemble leader. The ensemble leader conducts the section leaders with chironomic gestures, and the section leaders conduct the instrumentalists with chironomic gestures. Moreover, the section leaders *sing* as they "chironomize". All these aspects of Egyptian practice have their strict, yet *independent* parallels in *1 Chronicles 25*.

Nor did the Levitical academy have only a few personnel trained in the art of psalmody. "The number of them along with their brethren, who were trained in singing to the LORD, *all who were skilful*, was *two hundred and eighty-eight*. And they cast lots for their duties, small and great, *teacher and pupil alike*" (*1 Chronicles 25:7-8*). This number leaves aside the pool of *four thousand* Levites mentioned above who could be trained in the performance of this music. Such an "academy" of sacred music has its historical parallels elsewhere, not just in ancient Egypt, but in ancient Mesopotamia.

At the dedication of Solomon's Temple, we find this academy at its historical height. "Now when the priests came out of the holy place (for all the priests who were present had sanctified themselves; and all the Levitical singers [at the very least, the 288 master musicians], Asaph, Heman, and Jeduthun, their sons and kinsmen, arrayed in fine linen, with cymbals, harps and lyres, stood east of the altar with a hundred and twenty priests who were trumpeters; and *it was the duty of the trumpeters and singers to make themselves heard in unison* in praise and thanksgiving to the LORD), and when the song was raised, with trumpets and cymbals and other musical instruments, in praise to the LORD, 'For he is good, for his steadfast love endures for ever,' the house, the house of the LORD, was filled with a cloud, so that the priests could not stand to minister because of the cloud; for the glory of the LORD filled the house of God" (*2 Chronicles 5:11-14*, RSV).

"*It was the duty of the trumpeters and singers to make themselves heard in unison*"? Why this? It is merely an *assumption* (based without question on preconceived notions about ancient music) that all the singers and instrumentalists were performing *the same note at the same time*. The corresponding passage in the KJV (verse 13) says: "It came even to pass, as the trumpeters and singers were *as one* (Hebrew **k^{e}'ehad**) to make *one sound* (**qol ehad**)...". The literal word order in Hebrew is, "*and it came to be as one to the trumpeters and to the singers to make heard one sound*". Now the word "one" (**ehad**) in Hebrew *can and often does* denote a *unity of parts*. The **te`amim** themselves in this passage -- **silluq**, **munah** and **telisha gedolah**, which are found on **vayhi k$^{e}$`ehad**, "*and it came to pass as one*" -- suggest to the ear that the trumpets and singers *joined together harmonically* to form "one sound". This implies *heterophony* (a simple one to be sure, given the capabilities and limitations of ancient instruments).

In the time of Reheboam, Solomon's son, the United Kingdom of Israel became the Divided Kingdoms of Israel and Judah. Over the centuries, the fortunes of the Temple in Judah rose and fell with those of the nation. But whenever the Temple liturgy was restored, its ancestral *psalmody* was restored with it. Thus we find under King Joash and Jehoiada the High Priest that the burnt offerings were offered as prescribed by the Law of Moses "with joy and with song, *according to the hands of David* (**`al yedê david**)" (*2 Chronicles 23:18*, literal Hebrew, as punctuated by the **te`amim**). Just as David had ordained, then, psalms were still being sung by the Levitical academy as a necessary accompaniment to the sacrifices.

Not even the Babylonian Exile was enough to destroy the transmission of the Davidic chironomy or the psalmody based on it. "And when the builders laid the foundation of the temple of the LORD [the Second Temple as it originally stood], the priests in their vestments came forward with trumpets, and the Levites, the sons of Asaph, with cymbals, to praise the LORD, *according to the directions* [or rather the *chironomy*] *of David king of Israel* (**`al yedê david melekh yisra'el**); and they sang responsively, praising and giving thanks to the LORD, 'For he is good, for his steadfast love endures for ever toward Israel'" (*Ezra 3:10=11*).

We find a rather strange passage in *1 Chronicles 9:33-34*, which seems to leave out the names of the very Levites to which it refers. Bullinger's *The Companion Bible* (pp. 543-544) links this passage with *1 Chronicles 9:14-16*; *Nehemiah 11:15*; *12:28*; *11:22*; and *2 Chronicles 34:12*. *1 Chronicles 9:33-34*, then, refers to the chief Levitical singers extant in Nehemiah's time. (Biblical Hebrew often does unusual things with antecedents by English standards.) "Now these are the singers, the heads of fathers' houses of the Levites, dwelling in the chambers of the temple free from other service, *for they were on duty day and night*" (9:33). The Second Temple, then, had services "24/7/365" (in modern parlance), and the ancient psalmody was a vital part of those services. (Compare *Psalms 134:1*: "Come, bless the LORD, all you servants of the LORD, who stand by night in the house of the LORD!")

What then of the practice of *prosody*? It appears that *Moses* (not David) was the inventor of the chironomy for both prosody and psalmody. Moses was the author of *Psalm 90* (according to its title); and as we will see, his musical "style" has a gravity all its own. But he was also the traditional author of the Torah, and in particular of the "Song of the Sea" in *Exodus 15*. This is the first musical expression we have from Israel as a nation; and it is a rustic, yet moving one, based (in Haïk-Vantoura's reconstruction of it) on only the degrees of the scale and the simplest of melismas. Nevertheless, the Song has a *melodic precision* which a simple "folk tune" (such as one finds attached to it in the oldest synagogue chants) completely lacks. How could Moses teach the children of Israel to sing this song with him, without recourse to written notation (especially since the Israelites brought no photocopiers with them)? The answer should now be obvious: through *chironomy*! Most likely Moses and the people sang responsively, with Moses singing long solo parts (using both scale degrees and melismas) in verse 1-2 and 4-17 and the people singing refrains (using only scale degrees) in verses 3 and 18.

Less than fifty days later, on **Shavu`ot** (the Feast of Weeks; the **Pentecost** of the New Testament), Israel stood at the foot of Mt. Sinai and heard God "speak" the Ten Commandments. Was this merely a *verbal* recitation? The Masoretic Text of the Ten Commandments suggests an awe-inspiring alternative: *God "cantillated" the Ten Commandments*. Consider this by way of illustration. Moses and Joshua "*spoke* all the words of this *song*", the Song of Moses in *Deuteronomy 32:1-43* (cf. *Deuteronomy 31:30* and *32:44*). How does one "speak" a "song"? By "*cantillating*" it to a melody that takes the place of the normal vocal inflection. This sort of "speech-song" is the very essence of biblical prosody. So then: who was the creator of the *uniquely complex* melody that accompanies the Ten Commandments as God "spoke" them (*Exodus 20* and *Deuteronomy 5*)? Was it God Himself, or Moses transcribing God's thunderous "vocal inflection" into musical terms? Either way, it is not surprising that medieval sources claimed that the **te`amim** were revealed (in one fashion or another) to Moses on Sinai!

Until the very end of the Second Temple period, the Levitical psalm-singers performed the ancestral melodies for prose and poetic texts, with their accompanying forms of chironomy. The book of *Ben Sira* (*Ecclesiasticus*) mentions the Levites' work in psalmody favorably. *Josephus* mentions a minimum of 12 singers and 12 instrumentalists in the psalmodic ensembles. We have already mentioned the role of the priestly "*Elders of Bathyra*" (considered by some to be the *Herodians* of the *New Testament*) in preserving the ancestral melodies.

Even without a complete reconstruction of the biblical chironomy, then, we can understand a great deal about it in principle -- thanks to the biblical and historical testimonies about Temple music, and especially thanks to Haïk-Vantoura's decipherment of the notation which transcribes the ancient chironomy.

Here then are the parallels between biblical and Egyptian chironomy:

	Biblical chironomy represented *precise musical values* (degrees of a modal scale and melismas of generally no more than three notes);
	It could represent *single notes* or (through the use of several chirononists) *simple intervals* (the same ones as the Egyptian chironomy and more besides);
	In an ensemble, it could be used by the *ensemble leader* and by *section leaders* to conduct a simple *heterophony*;
	It used *both hands* in cooperation to represent notes and melismas, and (in the case of the cymbals in psalmodic ensembles) *one* hand to represent rhythm;
	It was used in *priestly*, *courtly* and *popular* music (all of which generally had *religious overtones*);
	As an art form, it *took the place of musical notation* (evoking to the eye what the ear heard);
	The music it represented had a *connection with the divine* in the Hebrew mind.

Now we are ready to reconstruct the *actual chironomy* behind the te'amim of the Masoretic Text.

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